

Chapter I

Were the Neandertals Our Ancestors?

On an August day in 1856, in the Neandertal Valley in northwestern Germany, a workman in a limestone quarry uncovered the bones of what he thought was a cave bear. He put them aside to show to Johann Fuhlrott, the local schoolteacher and an enthusiastic natural historian.

Fuhlrott immediately realized this was something much more significant than the bones of a bear. The head was about the size of a man's, but it was shaped differently, with a low forehead, bony ridges above the eyes, a large projecting nose, large front teeth, and a bulge protruding from the back. The body, to judge from the bones that were recovered, must also have resembled a man's, though he would have been shorter and stockier—and far more powerful—than any normal man. Making the bones even more significant, Fuhlrott realized, was that they'd been found amid geological deposits of great antiquity.

The schoolteacher contacted Hermann Schaaffhausen, a professor of anatomy at the nearby University of Bonn. He, too, recognized that the bones were extraordinary: “a natural conformation hitherto not known to exist,” as he later described them. Indeed, what the workman had uncovered, Schaaffhausen believed, was a new—or rather a very, very old—type of human

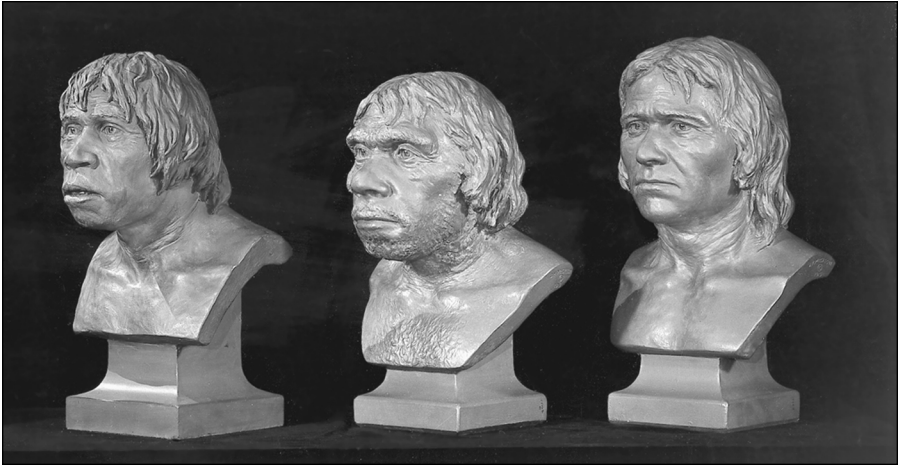
being, one that would come to be called a Neandertal. Perhaps, Schaaffhausen may even have suspected, the Neandertals were ancient ancestors of modern man.

If the professor and the schoolteacher expected the scientific establishment to celebrate their discovery, they were sorely disappointed. Charles Darwin's theory of evolution, as spelled out in *The Origin of Species*, was still three years from its publication, in 1859. To most scientists, the idea that humans evolved from any other species, let alone one represented by these bones, seemed entirely absurd. Rudolf Virchow, the leading pathologist of the day, examined the bones and declared that they belonged to a normal human being, albeit one suffering from some unusual disease. Other experts followed suit.

By the end of the nineteenth century, however, Darwinism prevailed in most scientific circles. Some scientists, such as Gabriel de Mortillet in France, took another look at the bones and argued that modern humans evolved from Neandertals. The discovery of more Neandertal remains—in France, Belgium, and Germany—buttressed their case. These fossils dated back to between 110,000 and 35,000 years ago, making it impossible to dismiss them as either diseased or modern.

But the majority of scientists, led by another Frenchman, Marcellin Boule, still adamantly rejected Neandertals as human ancestors. The skeletons may have been ancient, Boule conceded, but they were no kin of his. This bent-kneed, squat-necked, curve-spined Neandertal was more ape than human, Boule argued. If modern humans had anything at all to do with them, he suggested, it could only have been that our *real* human ancestors, whoever they were, might have wiped out this “degenerate species.”

For most of the twentieth century, the scientific rift only widened. On the one side were Mortillet's followers, who viewed Neandertals as our direct, albeit primitive, ancestors. On the other side were those who, like Boule, saw the Neandertals as at best our distant cousins, an evolutionary dead end destined to be replaced by modern humans. Only in the past few years have scientists begun, very tentatively, to build a bridge across this bitter divide.



Are there any Neandertals in the family? From left, Piltdown Man, Neandertal Man, and Cro-Magnon (modern) Man. Courtesy Department of Library Services, American Museum of Natural History.



One reason why Boule's followers were able to dismiss the Neandertals, well into the twentieth century, was that they could put forward their own and much more reassuringly familiar candidate for human ancestor. This was the infamous Piltdown man, discovered in 1912. An amateur fossil hunter named Charles Dawson found the Piltdown bones at a common by that name in Sussex, England, and they were an immediate sensation. Unlike Neandertal's skull, Piltdown's was in most respects just like that of a modern human being. Only the apelike jaw seemed primitive, and even there the flat-topped teeth added a human touch. Here was an ancestor whom Boule would have been happy to call his own.

The problem was that Piltdown was a hoax. Someone, probably Dawson, had fused parts from a modern human skull with the jaw of an orangutan, then stained them to make them seem older. The teeth had been filed down to throw investigators off the track. It was not until 1953 that scientists thought to look at the teeth under a microscope, at which point the file marks were plainly visible.

Now the scientific momentum shifted in favor of Neandertals as human ancestors. Instead of emphasizing how different they were from us, scientists started focusing on the similarities. In 1957 two American anatomists, William Straus and A. J. E. Cave, took a new look at the very same fossil that had formed the basis of Boule's description of Neandertals as brutish and nonhuman. This was the La Chapelle-aux-Saints fossil, found in a cave in southern France in 1908.

The first thing Straus and Cave noticed was that the Chapelle-aux-Saints man suffered from arthritis. Boule noticed this, too, but he ignored the implications. To Straus and Cave, the arthritis explained the Neandertal's stooped posture, and the rest of the Neandertal man suddenly didn't seem so different from a modern human being. The two anatomists concluded that if Neandertal man "could be reincarnated and placed in a New York subway—provided that he were bathed, shaved, and dressed in modern clothing—it is doubtful whether he would attract any more attention than some of its other denizens."

The post-Piltown period saw a reevaluation of Neandertal behavior as well as looks. In the 1960s the American anthropologist C. Loring Brace led the way with new studies of Neandertal tools, technology, and living arrangements. From the pattern of ashes they left behind, for example, Brace deduced that the Neandertals were baking their food in shallow pits not so different from those of later humans. Others noted that many Neandertal remains appeared to have been buried intentionally—a practice that was undeniably human. Carefully arranged bones of animals at various Neandertal sites seemed also to indicate some sort of ritual slaughter, and the Neandertal bones at the Yugoslavian site of Krapina were broken up in a way that hinted at cannibalism. These were rituals that, however macabre, were definitely human.

The glorification of Neandertals reached its high point in 1971, with the publication of Ralph Solecki's work at an Iraqi cave known as Shanidar. Soil samples taken from a Neandertal burial there found an extraordinarily high level of wildflower pollen, far more than could have been blown in on the wind or carried on animals' feet. Solecki inferred that the Shanidar Neandertals had

placed offerings of flowers on their burial sites, and he called his book *The First Flower People*. As additional evidence of their humanity, Solecki noted that the remains of one of the older people buried there indicated he had a withered right arm and was blind. These conditions would certainly have led to his early death—unless members of his family or tribe took care of him.

With Solecki's book, the Neandertals' transformation was complete. No longer the apelike brutes of Boule's imagination, they were now sort of protohippies, a people in many ways more humane than modern humans. This was also the high point for what became known as the "regional continuity" theory, according to which modern humans evolved from Neandertals in Europe and the Middle East, and from other, similarly archaic people in other regions. But the Neandertal image (and with it, the regional continuity theory) was about to suffer another reversal. The attack this time came not from archaeologists or anthropologists, but from molecular biologists.



The biologists knew little about fossils, even less about archaeology or anthropology. But they knew a lot about a small segment of genetic material known as mitochondrial DNA, or mtDNA for short. A team of Berkeley biologists—Rebecca Cann, Mark Stoneking, and Allan Wilson—calculated the rate at which human mtDNA mutated, and in 1987 came up with a new estimate of human origins: about two hundred thousand years ago.

This hypothetical mother of the human race was dubbed, appropriately, Eve.

Here was a new human ancestor, and unlike Piltdown, this was no hoax. If the biologists were correct, and Eve lived about two hundred thousand years ago, then modern humans were on the scene more than a hundred thousand years earlier than scientists had previously thought likely. That meant the first modern humans were around well before the disappearance of Neandertals—some of whom still lived, judging from fossils found on the Iberian Peninsula, as recently as twenty-eight thousand years ago.

Proponents of the idea that Neandertals were our ancestors were thrown into disarray; after all, if some Neandertals were

more recent than modern humans, that made it much less likely that the former evolved into the latter. And if modern humans were around *before* Neandertals even appeared, as now seemed possible, then the evolution was an out-and-out impossibility.

New methods of dating ancient remains supplied more evidence that modern humans dated back as far as, if not farther than, Neandertals. Scientists estimated that Neandertals were at various sites in the Middle East about sixty thousand years ago, well within the range they'd previously estimated. But the new dates for modern humans were a real shocker: it turned out that they were in the area about ninety thousand years ago—much earlier than previously thought.

Meanwhile, archaeologists were also redating sites in sub-Saharan Africa, where they found evidence of modern humans from as long as a hundred thousand years ago, and by some calculations up to two hundred thousand years ago. This dovetailed with the findings of the biologists that Eve's home—her Eden—had been in Africa. Cann, Stoneking, and Wilson had found that the mtDNA of modern Africans showed significantly more diversity than that of other races. They interpreted this to mean that Africans had had more time to evolve; hence the original human beings must have been African.

So, according to what became known as the “out of Africa” theory, the human race first emerged in Africa, then spread to the Middle East, and finally reached Europe. In the latter two continents, humans encountered the more primitive Neandertals, and—as was the case with so many other species who came into contact with humans—the Neandertals ended up extinct. By the early 1990s the “out of Africa” scenario had replaced regional continuity as the dominant theory.

The latest blow to regional continuity came in 1997, again from molecular biologists. Matthias Krings and his colleagues at the University of Munich managed to extract a snippet of mtDNA from the arm bone of an actual Neandertal—in fact, from Fuhlrott's original Neandertal man. They then compared the Neandertal mtDNA with that of living humans and discovered that they differed in 27 of the 379 spots they examined. (In contrast, the African mtDNA samples, which showed greater diversity than

that of any other modern humans, differed from each other in only 8 spots.) The genetic distance between Neandertals and modern humans, Krings concluded, made it very unlikely that Neandertals were our ancestors.



The regional continuity proponents didn't take any of this lying down. They questioned the validity of the genetic and dating evidence, and in 1999 they struck back with a dramatic discovery of their own. About ninety miles north of Lisbon, Portuguese archaeologists uncovered the skeleton of a 24,500-year-old boy who appeared to be part human, part Neandertal. The boy's face was that of an anatomically modern human, but his body and legs were Neandertal. The dating, which placed the boy after the pure Neandertals were extinct, seemed to indicate that the child was the descendant of generations of Neandertal and modern human hybrids.

If Neandertals and modern humans had interbred, the regional-continuity proponents were quick to point out, they could hardly have been as unlike each other as the out-of-Africa advocates had argued.

The Portuguese discovery could have further polarized the field, leaving both sides defending seemingly irreconcilable evidence and theories. To some extent, that happened: long-time defenders of each lined up to hail the new find or to dismiss it. But their rhetoric seemed somewhat more muted than after past discoveries, perhaps because the focus of the debate was changing. Instead of arguing about whether Neandertals or other archaic humans evolved into modern humans, scientists were increasingly focusing on the issue of how Neandertals and moderns interacted.

Did they fight with each other? Did they learn from each other? Did they speak, or breed, or perhaps just ignore each other?

Perhaps archaeologists or microbiologists—or practitioners of some entirely different discipline—will someday be able to answer these questions. For now, the answers are very speculative, albeit intriguing. The German anthropologist Gunter Brauer, for example, has proposed a more moderate version of the out-of-Africa

scenario. According to Brauer, modern humans did indeed emerge from Africa, then went on from there to the rest of the world. But though they were in many ways different from the Neandertals they encountered in the Middle East and Europe, they were not so different that they couldn't interbreed with them. So, Brauer proposed, modern humans could have some Neandertal ancestors, even if the Neandertal genes are only a minuscule part of our makeup.

On the other side of the aisle, some proponents of regional continuity, such as the Tennessee anthropologist Fred Smith, readily conceded that a key genetic change in human makeup occurred in Africa. But Smith argued that the European and Middle Eastern Neandertals, far from being overrun by the newcomers, took them in and incorporated their genetic advantages.

Neither Brauer's nor Smith's compromise was fully embraced, nor can it be said that there's anything near a consensus on the place of Neandertals in human prehistory. But a majority of scientists would now agree that, whatever the relationship between Neandertals and modern humans, the two overlapped in time and probably in place. So somewhere, most likely first in the Middle East and later in Europe, these two kinds of people—people far more different from each other than any of today's races, yet each possessing some recognizably human characteristics—first confronted each other.

No one knows for sure what happened next.

To investigate further

Richard Leakey and Roger Lewin, *Origins Reconsidered* (New York: Doubleday, 1992). Leakey, who is best known for his discoveries of fossils much older than those relevant to the above discussion, is nonetheless insightful and provocative on the Neandertal question. He started off believing in regional continuity, partly because he found appealing the apparent inevitability of the emergence of modern humans from all sorts of archaic peoples around the globe. But he gradually came to lean toward "out of Africa," with its even more appealing implication that all the races of today's world are one people.

Erik Trinkaus and Pat Shipman, *The Neandertals* (New York: Alfred A. Knopf, 1993). A comprehensive history of the Neandertal controversies. Trinkaus, an anthropologist, is one of the leading proponents of regional continuity, but his

historiography is admirably unbiased. The book's only flaw is the authors' tendency to interject thumbnail sketches of the leading scientists, whose lives—at least as described here—were not, in general, as interesting as their discoveries or ideas.

Christopher Stringer and Clive Gamble, *In Search of the Neanderthals* (New York: Thames & Hudson, 1993). Stringer is the leading proponent of the “out-of-Africa” theory, but like Trinkaus, he's fair to both sides. British authors such as Stringer, by the way, have stuck with the traditional “Neanderthal” spelling; most others now spell it “tal.”

James Shreeve, *The Neanderthal Enigma* (New York: William Morrow, 1995). A popular science writer's clear and often elegant account of the ongoing debate.

Paul Mellars, *The Neanderthal Legacy* (Princeton, N.J.: Princeton University Press, 1996). A technical but useful overview of Neanderthal behavior, especially how they may have organized their communities.

Matthias Krings, Anne Stone, Ralf Schmitz, Heike Krainitzki, Mark Stoneking, and Svante Paabo, “Neanderthal DNA Sequences and the Origin of Modern Humans,” *Cell* 90 (July 11, 1997). The mtDNA analysis of the 1856 Neanderthal specimen.

Ryk Ward and Christopher Stringer, “A Molecular Handle on the Neanderthals,” *Nature* 388 (July 17, 1997). A less technical summary of Krings's findings.

Cidalia Duarte, Joan Mauricio, Paul Pettitt, Pedro Souto, Erik Trinkaus, Hans van der Plicht, and João Zilhão, “The Early Upper Paleolithic Human Skeleton from the Abrigo do Lagar Velho (Portugal) and Modern Human Emergence in Iberia,” *Proceedings of the National Academy of Sciences* 96 (June 1999). The discovery of a Neanderthal-modern human hybrid.